MUKILTEO MULTIMODAL PROJECT
FINAL ENVIRONMENTAL IMPACT STATEMENT

Noise and Vibration
Discipline Report

Prepared for:

U.S. Department of Transportation
Federal Transit Administration

Washington State Department of Transportation

June 2013

Noise and Vibration Discipline Report

Mukilteo Multimodal Project
Final Environmental Impact Statement

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For:

Federal Transit Administration and
Washington State Department of Transportation

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Table of Contents

List of Attachments (provided on CD)

List of Exhibits

Acronyms and Abbreviations

AADT	average annual daily traffic
CFR	Code of Federal Regulations
dB	decibel
dBA	A-weighted decibel
DNL	Day Night Level
DNR	Washington State Department of Natural Resources
EDNA	Environmental Designation for Noise Abatement
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FRA	Federal Rail Administration
HOV	high-occupancy vehicle
HT	heavy truck vehicle (greater than 2 axle 6 wheels)
Hz	hertz
in/sec	inches per second
L_{eq}	equivalent sound pressure level
L_{dn}	day – night sound level
L_{min}	minimum sound level
L_{max}	maximum sound level
MMC	Mukilteo Municipal Code
MPH	miles per hour
MT	medium truck vehicle (2 axle 6 wheels)
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
PPV	peak particle velocity
SEL	sound exposure level
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Office

SR	State Route
TNM	Traffic Noise Model
USDOT	U.S. Department of Transportation
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

1 THE MUKILTEO MULTIMODAL PROJECT

The Washington State Department of Transportation (WSDOT), Ferries Division (also known as Washington State Ferries [WSF]) proposes the Mukilteo Multimodal Project to improve the operations and facilities serving the mainland terminus of the Mukilteo-Clinton ferry route in Washington State. The Federal Transit Administration (FTA) may fund part of the proposed project.

WSDOT and FTA are preparing this Environmental Impact Statement (EIS) for the project in compliance with the National Environmental Policy Act (NEPA) and the State Environmental Policy Act (SEPA). FTA is the federal lead agency for the NEPA environmental review process. WSDOT is the state lead agency for SEPA.

The ferry route is part of State Route (SR) 525, the major transportation corridor across Possession Sound, which separates Island County (Whidbey Island) from the central Puget Sound mainland. In 2012, the Mukilteo-Clinton route had the most vehicle trips and the second-highest total ridership in the system. Figure 1 shows the regional setting and Figure 2 shows the general project area.

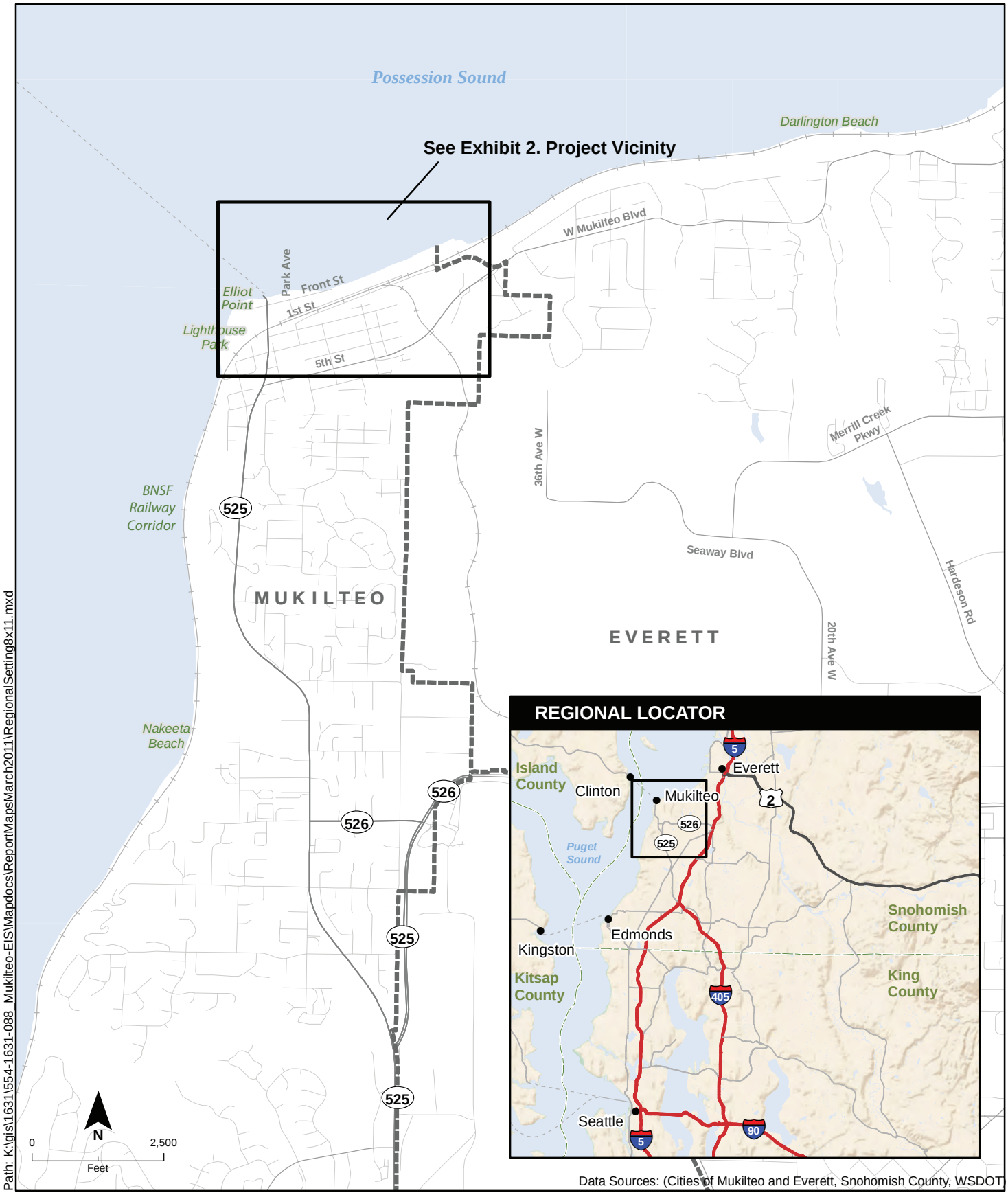
1.1 The Mukilteo Ferry Terminal Area

The existing Mukilteo ferry terminal is located in the city of Mukilteo in Snohomish County, Washington, west of the Mukilteo/Everett city line. The shoreline in this area faces north to northwest and runs primarily east-west within the project area. West of the existing terminal are Elliot Point and Mukilteo Lighthouse Park.

To the east of the existing terminal is the Mukilteo Tank Farm, a 20-acre area, previously used by the U.S. Air Force, and featuring lands, buildings, and a large pier formerly used for fuel storage and loading. A research facility operated by the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service is on the west and north portion of the Mukilteo Tank Farm; the research facility is also known as the NOAA Mukilteo Research Station. The Mukilteo/Everett city line is at the eastern end of the Mukilteo Tank Farm. The Mount Baker Terminal, a marine-to-rail intermodal facility operated by the Port of Everett, is located just east, in the city of Everett.

Elliot Point and its original shoreline area include several important historic and archaeological sites, including a buried shell midden created by Native American peoples, with deposits dating back over 1,000 years. In fact, the name Mukilteo is derived from a Salish word meaning "a good place to camp."

BNSF owns and operates a railroad that runs south of the Mukilteo ferry terminal and adjacent to the southern boundary of the Mukilteo Tank Farm. The BNSF tracks mostly follow the shoreline between Seattle and Everett. East of where the railroad crosses under SR 525, it borders the Mukilteo Tank Farm, and a rail spur connection extends to the Mount Baker Terminal. Sound Transit's Sounder



City Boundary

Exhibit 1. **Regional Setting**

N

0 250 500

FEET

Existing Terminal

Project Area

Mukilteo Tank Farm

City Boundary

Exhibit 2. **Project Vicinity**

commuter rail also uses the BNSF tracks. Its Mukilteo Station is located southeast of Park Avenue, between the Mukilteo Tank Farm and the BNSF railroad tracks.

1.2 Purpose and Need

The following purpose and need statement will guide decisions about the project.

1.2.1 Project Purpose

The purpose of the Mukilteo Multimodal Project is to provide safe, reliable, and efficient service and connections for general-purpose transportation, transit, high-occupancy vehicles (HOVs), pedestrians, and bicyclists traveling between Island County and the Seattle-Everett metropolitan area and beyond. The project is intended to:

- Reduce conflicts, congestion, and safety concerns for pedestrians, bicyclists, and motorists by improving local traffic and safety at the terminal and the surrounding area that serves these transportation needs.
- Provide a terminal and supporting facilities with the infrastructure and operating characteristics needed to improve the safety, security, quality, reliability, and efficiency of multimodal transportation.
- Accommodate future demand projected for transit, HOV, pedestrian, bicycle, and general-purpose traffic.

1.2.2 Project Need

The existing facility is deficient in a number of aspects, including safety, multimodal connectivity, capacity, and the ability to support the goals of local and regional long-range transportation and comprehensive plans, including future growth in travel demand. Those factors, which are further described below, demonstrate the need for an improved multimodal facility.

Safety and Security

Safety is WSDOT's top priority, and security at transportation facilities is a national concern. Safety and security come into play with this project in several ways: at the pedestrian/vehicle interface, with the general traffic flow in the SR 525/Front Street vicinity, and in maintaining safety and security for the facility itself. Safety and security improvements are needed because:

- The Mukilteo ferry terminal has received few improvements since it was built in 1957. The existing timber structures, including the docking facilities, are beyond the end of their useful lives.
- The existing terminal does not meet current seismic standards. The existing facility is underlain by deep, potentially liquefiable soils that are highly susceptible to lateral spreading during an earthquake.

- Changed U.S. Coast Guard and U.S. Department of Homeland Security protocols now require the ability to secure terminal areas when there is a natural disaster, heightened security alert, or other emergency. The existing facility has city streets within the terminal area and does not allow for a physical separation between the terminal and open public areas, which increases safety and security concerns, and could require WSDOT to interrupt service or close the terminal to respond to an emergency or a heightened security alert.
- Collisions near the SR 525/Front Street intersection have included sideswipes, vehicle/pedestrian collisions, and collisions with parked vehicles.
- Because of congestion caused by ferry traffic, pedestrians often make high-risk decisions to cross the SR 525/Front Street intersection during breaks in ferry traffic; near misses between vehicles and pedestrians are common. Pedestrians who access the terminal area, transit facilities, surrounding businesses, and Mukilteo Lighthouse Park compete with vehicles for access to this intersection.
- Other inadequate facilities include a lack of passenger drop-off/pick-up areas and poor bus access to the bus bay; both increase congestion and the risk of accidents.
- Passengers who are loading and unloading from the ferry or going between the toll booth and the passenger building must traverse routes that do not meet the requirements of the Americans with Disabilities Act (ADA).

Transit Connectivity and Reliability

The current facility provides poor connections between transit, rail, and ferry modes, which significantly hamper the quality and reliability of the transportation system in this area and add to the overall transportation and safety problems related to the terminal. The major concerns are:

- Transit connections at the Mukilteo ferry terminal cannot adequately serve current or future needs. There are only two bus bays, located 200 feet away, uphill and across a major local street. The limited transit facilities are inadequate to support the current service, including staging and layover needs for transit operations, and there are limited boarding areas and amenities for transit riders. The current configuration would not allow bus service to be expanded. In addition, the Sounder commuter rail stops at the Mukilteo Station, approximately 2,000 feet from the existing terminal, and the streets between the ferry terminal and the station have missing or substandard pedestrian and bicycle facilities.
- Keeping the ferry on schedule is integral to multimodal connectivity and the ability of the system to meet growing demand by allowing passengers to make on-time connections to scheduled bus and train service. Inefficient vehicle staging slows fare collection, which delays departures. Lack of a dedicated HOV access lane makes it difficult to implement WSDOT's preferential program for carpools, and worsens operating efficiency. Also, pedestrians walking on and off the ferry use the same span that vehicles use. This requires passengers and

vehicles to be loaded at separate times, which leads to system inefficiency and can cause delays that last throughout the day.

Growth in Travel Demand

The Mukilteo-Clinton route connects the two segments of SR 525—the major transportation corridor between Island County (Whidbey Island) and the Seattle-Everett metropolitan area. SR 525 is classified as a Highway of Statewide Significance. In addition to serving ongoing travel demand, SR 525 is needed to connect the communities and military facilities on the island for evacuations, disaster relief, and medical emergencies.

WSDOT's travel forecasts highlight the higher future demand for improved multimodal facilities serving the Mukilteo-Clinton route: WSDOT predicts a 73 percent increase in annual passengers (1,840,000 to 3,175,000) on the Mukilteo-Clinton route from 2006 to 2030.

The Mukilteo-Clinton route serves a high number of commuter trips, and growth in employment on both Whidbey Island and on the mainland is a primary reason for the predicted growth in trips by ferry. In response, the *Washington State Department of Transportation Ferries Division Final Long-Range Plan: 2009–2030* calls for meeting the growing travel needs at the Mukilteo ferry terminal primarily through increasing the share of walk-on trips. This reinforces the need for improved connections and facilities between ferries and other modes, including transit, bicycle, and walking (WSDOT 2009).

Other Related Objectives

Through its public planning and outreach efforts, including public scoping comments, WSDOT has also identified environmental and project development goals to help guide the project:

- The project should be fiscally responsible and supportive of state, regional, and local transportation plans including, but not limited to, the *Washington State Department of Transportation Ferries Division Final Long-Range Plan: 2009–2030* (WSDOT 2009), as well as regional and local land use plans.
- The project should be sensitive to the rich cultural and environmental resources of the vicinity in a manner that respects and enhances these resources.
- The project should not preclude development of a second slip at the terminal in the future to provide operational flexibility or additional capacity.

1.3 Alternatives

The project is considering four alternatives:

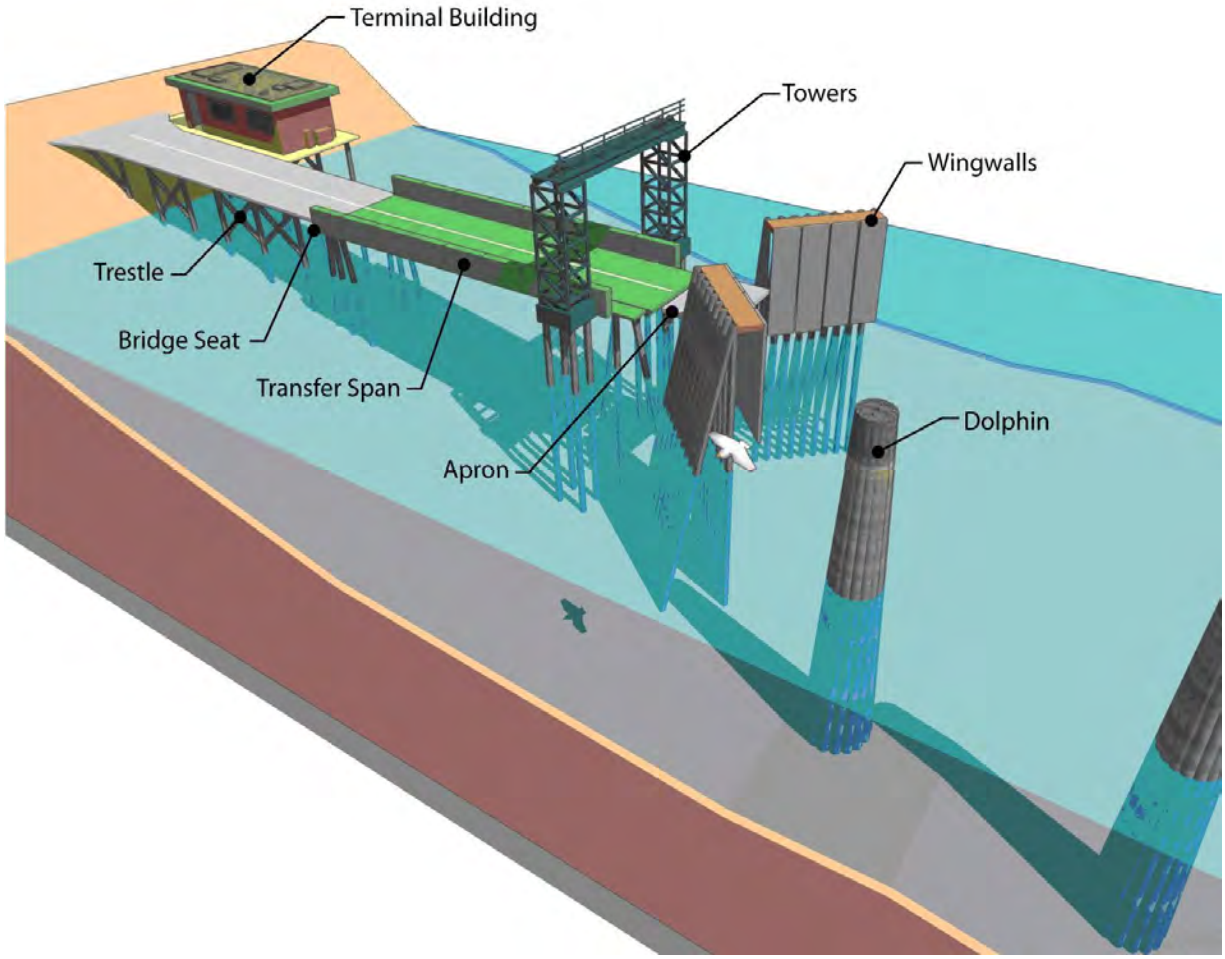
- The No-Build Alternative, which maintains the existing facility but does not improve it; this alternative provides a basis against which to compare the effects of the "Build" alternatives
- The Preferred Alternative (a modified Elliot Point 2 Alternative), which would relocate the terminal to the western portion of the Mukilteo Tank Farm as part of an integrated multimodal center, and it would remove the existing terminal
- The Existing Site Improvements Alternative, which would construct an improved multimodal facility by replacing the existing Mukilteo ferry terminal with an expanded terminal and multimodal center at the current site
- The Elliot Point 1 Alternative, which would relocate the terminal to the eastern portion of the Mukilteo Tank Farm as part of an integrated multimodal center and it would remove the existing terminal

1.3.1 No-Build Alternative

The No-Build Alternative provides a baseline against which to compare the effects of the Build alternatives. It includes what would be needed to maintain the existing ferry terminal at a functional level. Figure 3 shows the key parts of a typical ferry terminal.

Maintenance and structure replacements would occur in accordance with legislative direction to maintain and preserve ferry facilities, but WSDOT would make no major investments for improvements. Figure 4 illustrates the elements replaced as part of planned maintenance activities.

Nearly all of the ferry docking, loading, and unloading facilities would need to be replaced because they will have reached the end of their lifespan by 2040. The existing vehicle holding area would remain at its current location. The terminal supervisor's building, passenger and maintenance building, and the three existing toll booths would be replaced at their current locations. This alternative would not improve substandard conditions related to congestion, vehicular and pedestrian conflicts, poor sight distance, and security.



Key parts of a typical ferry terminal

fixed dolphin – an assembly of steel piles or concrete drilled shafts supporting a concrete cap and a fendering system.

floating dolphin – concrete or wooden barge structures located offshore clad with a perimeter fendering system and anchored to the seabed; used to help guide the ferry into the slip.

wingwall – an assembly of steel piles or concrete drilled shafts supporting a steel or concrete cap and a fendering system to guide and stop the ferry at its loading and unloading position.

tower – currently used to house and support the cable and counter weight system that supports, raises, and lowers the outboard end of the transfer span. (The tower system will be replaced by hydraulic lifts regardless of the alternative chosen.)

apron – adjustable ramp at the end of the transfer span that accommodates varying water heights.

transfer span – movable bridge that allows the vehicles and pedestrians access on and off the ferry; it is the link between the ferry and the trestle.

trestle and bridge seat – over-water stationary pile-supported bridge structure that serves as a connection between land and the nearshore end of the transfer span for both vehicle and pedestrian traffic (pedestrians do not use the trestle if overhead passenger loading is available).

Exhibit 3. Key Parts of a Typical Ferry Terminal

N

0 150 300

FEET

No-Build Alternative

Elements to be replaced

Ferry Traffic Control Light

Exhibit 4. **No-Build Alternative**

1.3.2 Preferred Alternative (Elliot Point 2)

The Preferred Alternative is a slightly modified version of the Elliot Point 2 Alternative that was studied in the Draft EIS. This alternative would develop the project on the western portion of the Mukilteo Tank Farm. It would have a more compact footprint than the Elliot Point 1 Alternative due to the deeper water near the shore where the ferry would berth. Its key features are shown on Figure 5.

The Preferred Alternative would construct in-water facilities that include the features needed for the ferry berth, including wingwalls and fixed dolphins. A floating dolphin would be relocated from the existing ferry terminal. The alternative will construct a new transfer span, including hydraulic-lifting mechanisms and structures and a bridge seat foundation, as well as a new concrete trestle and bulkhead. Because there is no beach and the water is deeper at this location, the ferry slip is near to the shore, which allows the trestle to be shorter than other alternatives, including fewer piles to support the trestle. The Tank Farm Pier, which includes approximately 3,900 piles, would be removed. A channel about 500 feet wide by 100 feet long would be dredged through part of the area currently occupied by the pier to provide a navigation depth of -28 feet at an average lowest tide, which would require dredging to a depth of -30 feet. Under the pier, current depths are -15 to -35 feet. Approximately 19,500 cubic yards of material would be dredged for the channel.

The existing ferry berth and all of its marine structures would be removed, including the Port of Everett fishing pier and day moorage. The Preferred Alternative would reconstruct the fishing pier and day moorage as part of the new multimodal facility.

A new passenger building and a maintenance building would be combined as a two-story building and aligned parallel to the shoreline. The building would bridge over the vehicle driveway to the ferry trestle, and an overhead loading ramp would connect to the second story of the building.

The vehicle holding area would have a 266-vehicle capacity. The terminal supervisor's building would be west of the vehicle holding area, as the second floor of a building that would also house the new toll booths. A new transit center with six new bus bays and a transit passenger area would be on the eastern part of the site, and it would have an area for ferry employee parking.

First Street would be realigned and extended as a four-lane roadway, beginning on a retained fill structure from the new signalized intersection with SR 525, descending to near the existing grade at Front Street, and continuing to a signalized entrance to the new ferry terminal. First Street would continue as a two-lane road to a new bus transit and paratransit center. This alternative also develops a public parking area between the BNSF railroad and the new First Street extension, near SR 525, to replace some displaced street parking. It also would modify the access road and the parking for

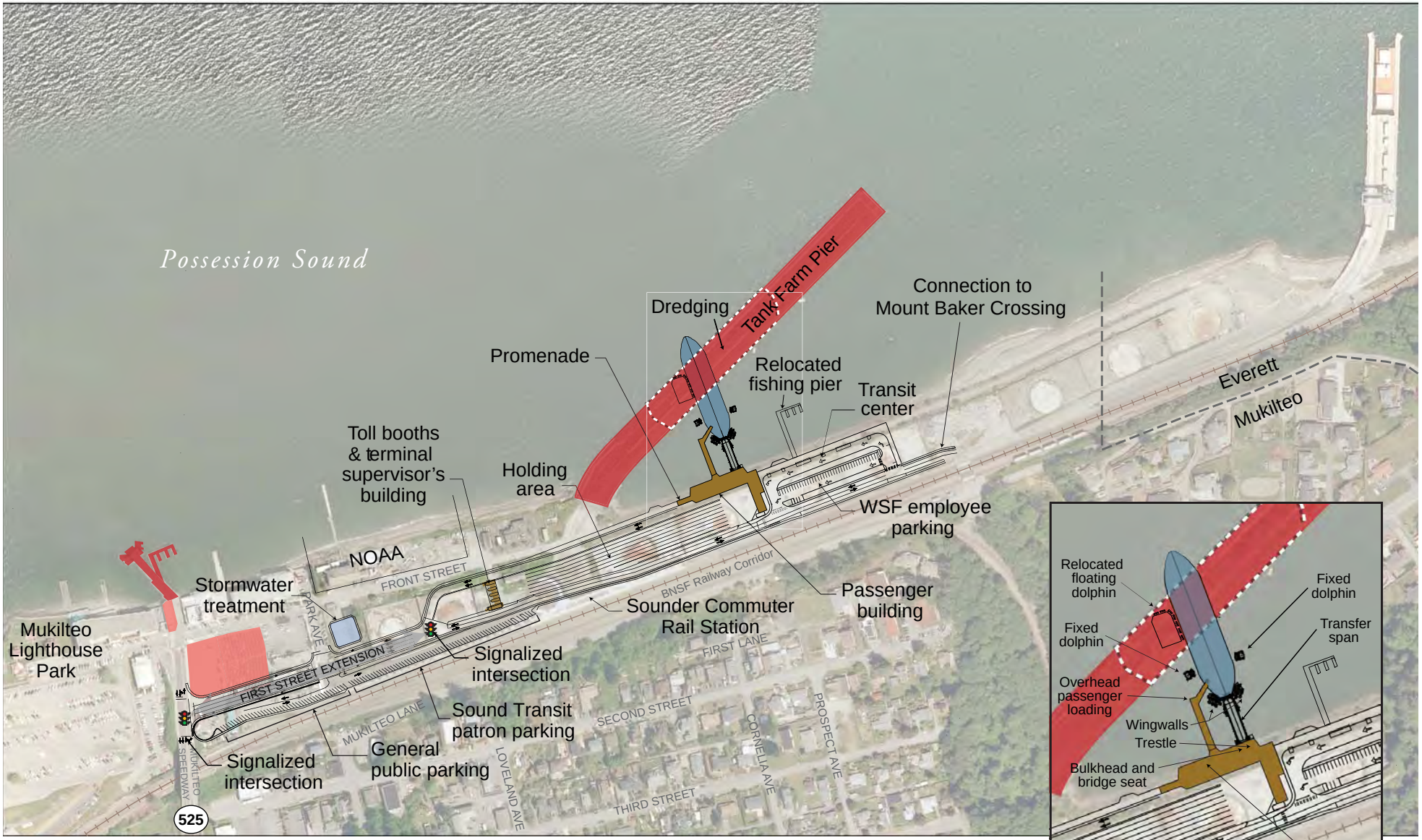


Exhibit 5. **Preferred Alternative (Elliot Point 2)**

the Mukilteo Station. A stormwater treatment facility would be located between Front Street and the First Street extension east of Park Avenue.

The First Street improvements also would include a reconstructed intersection with Park Avenue. The extended roadway would generally be along the southern portion of the Mukilteo Tank Farm. First Street would feature sidewalks and bicycle lanes.

A pedestrian pathway from First Street would connect to a waterfront promenade and on to the passenger building, which would include a passage allowing continuous pedestrian access along the waterfront. Other sidewalks and crosswalks would link the Mukilteo Station and the transit center. This alternative would include new security fences and gates surrounding the holding area and terminal.

1.3.3 Existing Site Improvements Alternative

The Existing Site Improvements Alternative would construct an improved multimodal facility by replacing the existing Mukilteo ferry terminal with an expanded terminal on and around the current site. Its key features are shown on Figure 6.

All of the existing ferry facility marine and upland features would be replaced. The ferry dock and trestle would be rebuilt facing due north to provide a straighter alignment with SR 525. The Port of Everett existing fishing pier and seasonal day moorage would be removed and need to be relocated.

The existing vehicle holding area would remain at the same general location and would still store approximately 216 vehicles, the equivalent of one-and-one-half 144-vehicle vessels. Toll booths and a supervisor's building would be constructed nearby. A new passenger and maintenance building would be constructed east of the ferry access driveway expanding into areas currently occupied by other uses. Overhead passenger loading ramps would connect to the second story of the new passenger building.

Front Street and Park Avenue would become one-way streets, and First Street would be extended west to a new signalized intersection with SR 525. A new transit center would be constructed east of the vehicle holding lanes, combined with a parking area for ferry employees.

Exhibit 6. **Existing Site Improvements Alternative**

1.3.4 Elliot Point 1 Alternative

The Elliot Point 1 Alternative would develop the Mukilteo Multimodal Project on the eastern portion of the Mukilteo Tank Farm. Its key features are shown on Figure 7.

Because the shoreline slopes more gradually in this location, the ferry slip would need to be located about 250 feet offshore, which would require a longer pier and trestle. A new passenger building and a maintenance building would be located over water on the new concrete trestle; this shortens walk distances and allows the nearby shoreline area to be developed for open space and stream restoration purposes. An overhead passenger loading ramp would connect to a second story of the new passenger building. A stormwater treatment facility would be located between Front Street and the First Street extension east of Park Avenue.

As with the Preferred Alternative, this alternative would remove the Tank Farm Pier and its piles, and it would dredge a navigation channel approximately 500 feet wide under where the pier is now located.

WSDOT would remove the existing ferry terminal, including buildings and marine structures, and the Port of Everett fishing pier and day moorage would be relocated. The current vehicle holding area would be vacated.

The Elliot Point 1 Alternative would also provide parking for commuter rail, the Mount Baker Terminal shoreline access area, and ferry employees. The alternative includes toll booths, ferry vehicle holding areas, and shoreline promenades on each side of the new ferry dock. Japanese Creek, which currently runs in a pipe culvert below the Mukilteo Tank Farm, would be restored to an open stream north of the extended First Street, with a 50-foot buffer on either side. The stream would be crossed by a pedestrian bridge near the shoreline.

The vehicle holding areas would hold about 216 vehicles. A terminal supervisor's building would be constructed above four new toll booths east of the holding area. This 35-foot-high structure would be oriented north-south. New lighting would illuminate First Street and the terminal facilities, including the vehicle holding areas.

First Street would be realigned and extended as a four-lane roadway from SR 525 to the Port of Everett's Mount Baker Terminal, with sidewalks and bicycle lanes. A new signalized intersection with SR 525 would be constructed. A rebuilt First Street/Park Avenue intersection would provide access to a reconfigured parking and access area for Mukilteo Station.

A new transit center with six bus bays would be built west of the new terminal. Access and parking for Mukilteo Station would be configured to connect to the First Street extension. New security fences and gates would secure the holding and terminal area during periods of heightened security, as required by the U.S. Coast Guard.

Exhibit 7. **Elliot Point 1 Alternative**

2 GUIDING PLANS AND POLICIES

Several federal and state laws, regulations, and agency guidelines govern project operation and construction sound and vibration levels. This section briefly discusses the noise and vibration requirements of these laws, regulations, and guidelines and how they address the effect on the local environment.

The Federal Transit Administration (FTA) establishes transit noise and vibration criteria in its 2006 manual titled Transit Noise and Vibration Impact Assessment. The Federal Highway Administration (FHWA) establishes noise criteria in the Code of Federal Regulations (CFR) 23 CFR 772. FHWA and the Washington State Department of Transportation (WSDOT) document guidance in the Procedures for Abatement of Highway Traffic Noise and Construction Noise; and in the WSDOT policy Traffic Noise Analysis and Abatement Policy and Procedures, dated 2006. Washington State further addresses construction noise control in state law, Washington Administrative Code (WAC) 173-60. The narrative below provides a brief description of the application of the guidance, procedures, and laws.

2.1 FTA Guidelines

An FTA manual, *Transit Noise and Vibration Impact Assessment*, May 2006, provides detailed guidance for analysis of noise and vibration for transit projects. The manual distinguishes between sources characterized as a fixed "point source," such as a transit center or ferry terminal, and those characterized as "line sources," such as a roadway. The point sources are also referred to as "stationary" noise sources.

The FTA manual groups the land uses surrounding a project into three categories, shown in Exhibit 8. The criteria used in the analysis depend on the land use category of the properties near the noise source. Commercial and industrial land uses are not included in the land use categories and are excluded from the analysis process because the activities within these buildings are compatible with higher noise levels.

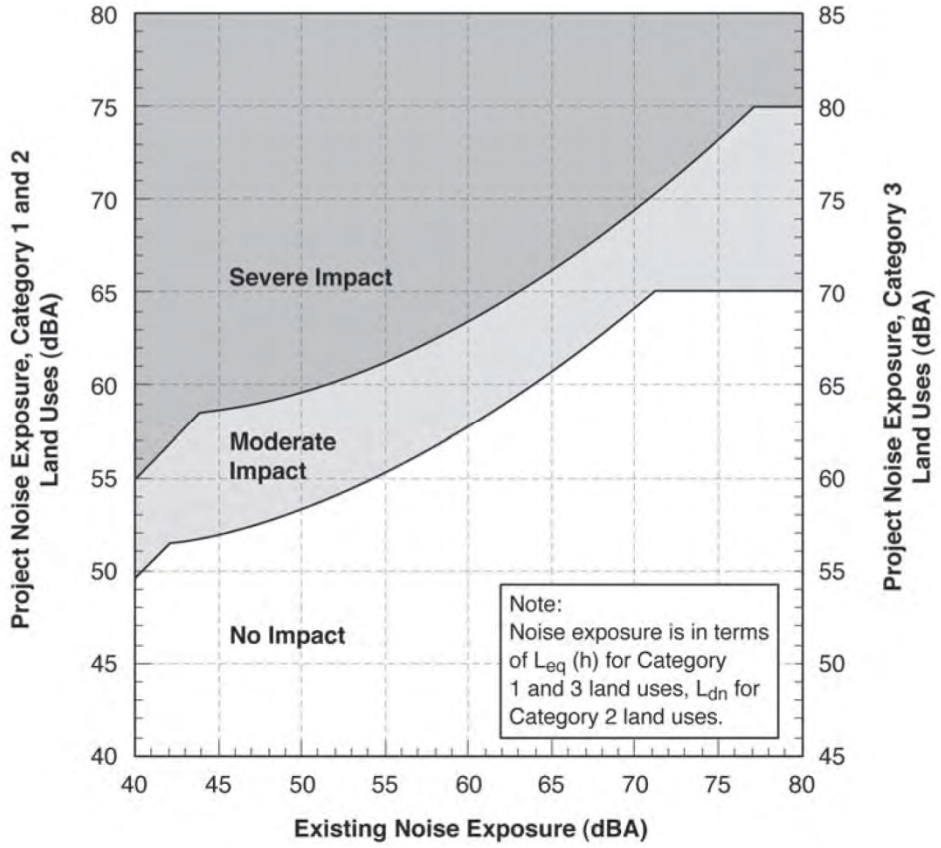
Exhibit 8. FTA Land Use Categories

Land Use Category	Description of Land Use Category
1	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Institutional land uses with primary daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Certain historical sites and parks are also included.

In the FTA guidance, the general processes for both noise and vibration analysis are similar, although they differ in the detailed applications. Each begins with a screening procedure. Affected receivers identified at this step then lead to a general and then a detailed assessment where FTA criteria are applied depending upon the seriousness of effect to the existing environment.

The noise impact criteria shown in Exhibit 9 are based on comparison of the existing outdoor noise levels and the future outdoor noise levels from the proposed project. They incorporate both absolute criteria, which consider activity interference caused by the transit project alone, and relative criteria, which consider annoyance due to the change in the noise environment caused by the transit project.

Exhibit 9. Noise Impact Criteria for Transit Projects



2.2 FHWA Regulations and Criteria

The FHWA defines traffic noise impact and abatement criteria in 23 CFR 772. WSDOT describes the application of these regulations in *Traffic Noise Analysis and Abatement Policy and Procedures* (WSDOT 2006), for the project design year. The criteria, called Noise Abatement Criteria (NAC), consider an impact if it exceeds or approaches the noise level at which a noise impact would occur. WSDOT has defined approach in its FHWA-approved policy to mean 1 A-weighted decibel (dBA). For example, for a residential receiver, a noise impact would occur if the predicted exterior Leq (noise level) is 66 dBA or higher. An impact applicable for other developed lands such as commercial and industrial uses occurs when a noise level approaches or exceeds 72 dBA. FHWA also considers a traffic-noise impact to occur if future noise levels are projected to result in a "substantial increase" or a 10 dBA increase over existing sound levels. Exhibit 9 shows the FHWA NAC.

Exhibit 10. Part 772 Noise Abatement Criteria (NAC)

Activity Category	$L_{eq}(h)^1$	$L_{10}(h)^1$	Evaluation Location	Description of Activity Category
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	70	Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72	75	Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	---	Undeveloped lands.
E	52	55	Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

[1]Hourly dbA, either $L_{eq}(h)$ or $L_{10}(h)$ but not both may be used on a project.

2.3 Combined FTA / FHWA Analysis

Much of the transit facilities analyzed for this project are anticipated to be rubber tired, line noise sources except where the buses and train are stationary at the route stop. It was agreed in February 1 2001 that this type of noise would be analyzed using FHWA criteria and methodology in Issue Paper #24. This paper will be used to guide the determination of what parts of the projects noise consideration will be analyzed using FHWA criteria and methods and what will use FTA criteria and methods. Exhibit 11 shows how the method and criteria is determined for the Mukilteo Multimodal Terminal Project.

Exhibit 11. FTA / FHWA Decision Matrix

Resource	Co-lead	FTA-Only	FHWA-Only
Method & Criteria	**Method & Criteria**	**Method & Criteria**	**Method& Criteria**
Point Source e.g. Park & Rides, Transit Centers	FTA	FTA	FTA
Line Sources e.g. Rubber Tired Vehicle on Roadways	FHWA	FHWA	FHWA

FHWA methodology and criteria (line source) are used for the roadways to the intersection with the physical boundary of the point source (e.g. curb line of a park and ride lot). For the point source, the analysis uses FTA methodology and criteria contained in the FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2006). In areas where the line source analysis area and point source analysis area overlap, the FHWA line source methodology and criteria are used. Each of the

project alternatives exhibits how the analysis considers impacts using the fill pattern line colors shown in Exhibit 11.

FHWA does not have a screening procedure. This analysis, in an attempt to stay consistent with FTA processes, using the FHWA Traffic Noise Model (TNM) 2.5 to determine the distance to the 65 dBA noise contour from the rubber-tired mobile or line sources. The model used to develop this distance consists of the 23 CFR 772 worst traffic hours on State Route (SR) 525 running speed limit speeds. Noise-sensitive receivers within this screening distance of the FHWA or the combined FTA / FHWA resource are added to the inventory of noise-sensitive sites for further consideration in the screening step. The analyst then constructs a noise model in TNM for only the affected receivers identified in the screening steps. Alternatives that screen out need no further analysis.

2.4 Other Federal Noise and Vibration Considerations

The other transportation modes affecting this environment include the Federal Rail Administration (FRA) facility, the BNSF railway, and Federal Aviation Administration (FAA) Paine Field airport resources. Because the project does not involve changes to the existing rail or aviation facilities, the analysis only employs FRA or FAA criteria to the extent that recent reports analyzed noise for the existing project area. Previous studies performed using the respective federal agencies criteria include the *Paine Field Airport Existing and Future Environmental Assessment Initiation of Commercial Service Noise Analysis*, November 2009; the Snohomish County Airport, Paine Field FAR Part 150 Noise Exposure Maps Update, September 2003; and the BNSF, City of Mukilteo Quiet Zone Agreement, April 2008 per FRA 49 CFR Parts 222 and 229. This Mukilteo Multimodal Noise and Vibration report assumes that the Sound Transit Mukilteo Commuter Rail Station (Mukilteo Station) also abides by the quiet zone agreement. The City of Mukilteo's documentation supporting the quiet zone is provided in Attachment A; the city is responsible for enforcing the quiet zone, which would include coordination with BNSF and Sound Transit when the crossing is completed. Engineers may still sound their horns at quiet zone crossings if they perceive a conflict could still occur, but even if horns are occasionally sounded at the crossing, the operation of the Mukilteo Multimodal Project would not create additional noise impacts.

Transit, rail, and ferry vehicles are equipped with horns and bells for use in emergency situations and as a general audible warning to railroad track and marine workers and trespassers within the right-of-way, as well as to pedestrians and motor vehicles at highway grade crossings. Horns and bells on the moving transit vehicle, combined with stationary bells at grade crossings, can generate noise levels considered to be extremely annoying to nearby residents. FTA incorporates the FRA horn noise model developed to analyze noise from docking ferry sources. This

model is also used to develop the screening in conjunction with the ferry operation for ferry terminals. It can also be used to analyze the effects from ferry horn noise in a general or detailed assessment should the analysis indicate it is needed. This report discusses further details of the horn noise analysis as needed in the sections addressing the general and detailed noise analyses.

2.5 State and Local Laws

WAC 173-60 establishes limits on the levels and durations of noise that may cross property boundaries. Chapter 8.18 of the City of Mukilteo Municipal Code (MMC) adopts WAC 173-60 with some modifications. Limits are set based on the Environmental Designation for Noise Abatement (EDNA) of the source and receiving properties. The EDNA categories are based on the property land uses, as shown in Exhibit 12. Residential areas have the lowest permissible noise levels, and the allowable nighttime levels are 10 dBA lower than the daytime levels. The WAC defines nighttime for weekdays as 10 PM to 7 AM, and the MMC further specifies that nighttime for weekends and holidays is 10 PM to 9 AM.

Exhibit 12. Maximum Permissible Environmental Noise Levels (dBA)

EDNA of Noise Source	EDNA of Receiving Property		
	Class A Residential (Day / Night)	Class B Commercial	Class C Industrial
Class A Residential	55 / 45	57	60
Class B Commercial	57 / 47	60	65
Class C Industrial	60 / 50	65	70

Source: WAC 173-60-040, MMC Chapter 8.18

WAC 173-60-050 establishes some noise sources as exempt from the above limits. Exempt noise sources include sounds originating from temporary construction sites as a result of construction activity, between 7 AM and 10 PM, and some of the noise sources associated with the Mukilteo ferry terminal, such as motor vehicles and warning devices (ferry horns). This exemption would not exempt these activities from impact assessments required as a part of federal regulation.

For the Mukilteo Multimodal Project these WAC and MMC EDNA criterion, do apply to nighttime construction work. Should project elements require night work, project developers must secure a variance to these regulations. Currently, no night construction work is anticipated.

3 METHODOLOGY AND ASSUMPTIONS

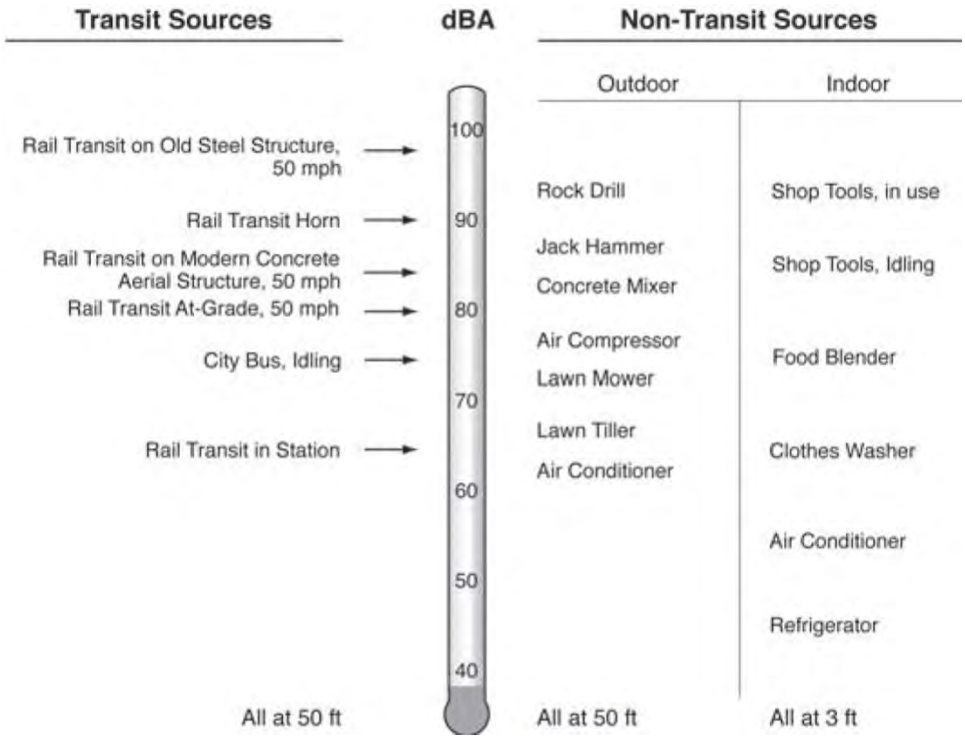
This section will explain some of the basic concepts for describing and identifying noise effects of sound on humans. It will further define some of the noise descriptors used in this report. Also, the discussion below details the equipment, models, and measurements used to determine project area sound levels.

The Mukilteo Multimodal Project requires noise modeling that uses both the FHWA TNM version 2.5, and the current FTA Noise Assessment Spreadsheet model developed by HMMH 7/3/2007. The FHWA TNM 2.5 will use measurements to validate the model to establish a FHWA screening distance for sound before dropping below the approach threshold of 65 dBA (WSDOT's approach NAC is 66 dBA). The FTA model first helps the analyst establish a screening distance in the three-phased approach to determine project noise effects. This report uses existing measurements taken from previous reports as well as recent field measurements taken for the project to establish the background sound level. In the FTA process the analyst compares this sound level with that modeled level from project elements to determine effects.

3.1 Sound Characteristics

Sound is created when objects vibrate, resulting in a minute variation in surrounding atmospheric pressure called sound pressure. The human response to sound depends on the magnitude of a sound as a function of its frequency and time pattern (EPA 1974). Magnitude measures the physical sound energy in the air. The range of magnitude from the faintest to the loudest sound the ear can hear is so large that sound pressure is expressed on a logarithmic scale in units called decibels (dB). Compared to physical sound measurement, loudness refers to how people subjectively judge a sound, and it varies from person to person. Magnitudes of typical transit and non-transit sound levels are presented in Exhibit 13.

Exhibit 13. Typical A-Weighted Sound Levels



Source: FTA Transit Noise and Vibration Impact Assessment Manual, May 2006

Humans respond to a sound's frequency or pitch. The human ear is very effective at perceiving sounds with a frequency between approximately 1,000 and 5,000 hertz (Hz), with the efficiency decreasing outside this range. Environmental noise is composed of many frequencies, each occurring simultaneously at its own sound pressure level. Frequency weighting, which is applied electronically by a sound level meter, combines the sound frequencies into one sound level that simulates how an average person hears sounds. The commonly used frequency weighting for environmental noise is A-weighting (dBA), which is most similar to how humans perceive sounds of low to moderate magnitude.

Because of the logarithmic decibel scale, a doubling of the number of noise sources, such as the number of cars operating on a roadway, increases noise levels by 3 dBA. A tenfold increase in the number of noise sources will add 10 dBA. As a result, a noise source emitting a noise level of 60 dBA combined with another noise source of 60 dBA yields a combined noise level of 63 dBA, not 120 dBA. The human ear can barely perceive a 3 dBA increase, while a 5 or 6 dBA increase is readily noticeable and sounds as if the noise is about 1.5 times as loud. A 10 dBA increase appears to be a doubling in noise level to most listeners.

Noise levels from traffic sources depend on volume, speed, and the type of vehicle. Generally, an increase in volume, speed, or vehicle size increases traffic noise levels. Vehicular noise is a combination of noises from the engine, exhaust, and tires. Other

conditions affecting traffic noise include defective mufflers, steep grades, terrain, vegetation, distance from the roadway, and shielding by barriers and buildings.

Noise levels decrease with distance from the noise source. For a line source such as a roadway, noise levels decrease 3 dBA over hard ground (concrete, pavement) or 4.5 dBA over soft ground (grass) for every doubling of distance between the source and the receptor. For a point source such as construction sources, noise levels will decrease between 6 and 7.5 dBA for every doubling of distance from the source.

Terrain and the elevation of the receiver relative to the noise source greatly affects the propagation of noise. Level ground is the simplest scenario. Noise travels in a straight line-of-sight path between the source and receiver. If the noise source is depressed or the receiver is elevated, noise generally travels directly to the receiver. Noise levels may be reduced because the terrain crests between the source and receiver, resulting in a partial noise barrier near the receiver. If the noise source is elevated or the receiver is depressed, noise often is reduced at the receiver. The edge of the roadway can act as a partial noise barrier, blocking some sound transmission between the source and receiver. Even a short barrier, such as a solid concrete jersey-type safety barrier, can be effective at further reducing noise levels. Breaking the line of sight between the receiver and the highest noise source reduces the noise level approximately 5 dBA.

3.2 Sound Level Descriptors

A widely used descriptor for environmental noise is the equivalent sound level (Leq). The Leq can be considered a measure of the average noise level during a specified period of time. It is a measure of total noise, or a summation of all sounds during a time period. It places more emphasis on occasional high noise levels that accompany general background noise levels. Leq is defined as the constant level that, over a given period of time, transmits to the receiver the same amount of acoustical energy as the actual time-varying sound. For example, two sounds, one of which contains twice as much energy, but lasts only half as long, have the same Leq sound levels. Leq measured over a one-hour period is the hourly Leq [Leq(h)], which is used for highway noise impact and abatement analyses.

The descriptor for cumulative 24-hour exposure, called the Day-Night Sound Level (Ldn) measures a 24-hour period that accounts for the moment-to-moment fluctuations in A-weighted levels due to all sound sources during that 24 hours. To account for increased residential sensitivity to noise during nighttime, 10 PM to 7 AM, Leqs representing these hours are penalized or increase by 10 dBA. FTA, FRA, and FAA, as well as many other federal agencies, have adopted the Ldn for determining the cumulative noise impacts for residential land use.

Either the total noise energy or the highest instantaneous noise level that occurs during the event can describe short-term noise levels, such as those from a single truck pass-by. The sound exposure level (SEL) is a measure of total sound energy from an event, and is useful in determining what the Leq would be over a period in time when several noise events occur. The maximum sound level (Lmax) is the greatest short-duration sound level that occurs during a single event. Lmax is related to impacts on speech interference and sleep disruption. In comparison, Lmin is the minimum sound level during a period of time.

People will generally find a moderately high, constant sound level more tolerable than a quiet background level interrupted by frequent high-level noise intrusions. An individual's response to sound depends greatly upon the range that the sound varies in a given environment. For example, steady traffic noise from a highway is normally less bothersome than occasional aircraft flyovers in a relatively quiet area. In light of this subjective response, it is often useful to look at a statistical distribution of sound levels over a given time period in addition to the average sound level. Such distributions identify the sound level exceeded and the percentage of time exceeded; therefore, it allows for a more thorough description of the range of sound levels during the given measurement period. These distributions are identified with an Ln where n is the percentage of time that the levels are exceeded. For example, the L_{10} level is the noise level that is exceeded 10 percent of the time. An example of this in Washington State, the Noise Control WAC allows exceedances of the thresholds listed in the EDNA's in Exhibit 12 for 15 minutes, the L_{25}, 5 minutes, $L_{8.6}$, and 1.5 minutes, $L_{2.5}$, of every hour.

3.3 Sound Level Measurements

WSDOT used the Ono Sokki LA-5560 with a type I microphone to measure sound levels near project sensitive sites and along SR 525 to validate the TNM 2.5 noise model. Both short-term, and long-term measurements were taken in accordance with WSDOT policy, FHWA's, highway noise measurement manual, and FTA's transit noise and vibration manual. This study also references measurements taken for the Port of Everett's rail/barge transfer facility's noise analysis (Port of Everett 2004), a WSDOT noise monitoring tech memo, for the purpose of securing the Mukilteo Quiet Zone, and measurements taken by Adolfson Associates Inc. Over the 7-year period these measurements were taken, traffic counts have not varied more than 5 percent This report assumes that sound levels, highly influence by traffic in the area, have not substantially changed over this period and the ambient background sound level may have actually gone down. The 6000 average annual daily traffic (AADT) counted at the Mukilteo ferry landing in the 2004 Annual Traffic Report, dropped to 5800 for the 2010 Annual Traffic Report.

3.4 Sound and Vibration Modeling

As discussed in previous sections, a noise analysis for projects that considers effects from highway, SR 525, transit facilities, the Mukilteo ferry terminal, and Mukilteo Station, must use both FTA and FHWA modeling and criteria.

The project makes improvements only to ferry and rubber-tired mobile sources and stationary facilities such as the ferry terminal building and Mukilteo Station. This noise and vibration analysis assumes the project would make no improvements to existing rail mobile sources. FTA guidance screens out rubber-tire type of project operational improvements for vibration-sensitive residential receivers beyond 50 feet, and does not require further vibration modeling. Stationary type improvements are considered to have no vibration effects to vibration-sensitive receivers.

As discussed earlier, the WAC and MCCs regarding noise control exempt construction noise during day time and do not regulate vibration effects. FTA guidance requires discussion of the project noise and vibration effects as a result of the project's construction activity. Due to the temporary nature of construction of this project, and the current limited knowledge of the types of equipment and techniques required to construct the project, this document qualitatively assesses construction noise and vibrations effects.

3.4.1 FTA Noise and Vibration Impact Assessment Model

In the FTA policy, the general processes for noise and vibration analysis are similar, although they differ in the detailed applications. Each begins with a screening procedure. FTA designed the procedure to identify sensitive land uses that could be affected by a project's noise or vibration sources. FTA's model uses conservative assumptions regarding noise and vibration effects from project sources to determine the distances the sound travels before it reaches a 50 dBA sound level.

The FTA's screening procedure identifies sensitive locations affected from any of the project noise or vibration sources. The project analysis advances to a greater level of detail for these identified noise- and vibration-affected land uses. The noise-sensitive lands that have a clear view to the noise source are called "unobstructed," and lands that have intervening rows of buildings, terrain, or other obstructions in the path to the noise source are referred to as "obstructed." Exhibit 14 shows the calculated obstructed and unobstructed screening distances based on the FTA or FHWA modeling appropriate for the noise source. If the screening procedure does not identify any potential problem areas, then no further assessment of potential noise abatement is necessary.

Exhibit 14. Noise and Vibration Screening Distances

Facility	Noise Screening Distance (feet) Unobstructed / Obstructed	Vibration Screening Distance (feet) Unobstructed / Obstructed
Ferry Vessel Terminal Dock	300 / 150	--
Parking Facility	125 / 75	--
Access Roads	35[1]	--
Transit Center / Mukilteo Station	250 / 200[2]	50 / 50

[1] Based on the Combined FTA / FHWA guidelines screening distance determined by TNM 2.5 modeling and distance to the 65 dBA contour.

[2] The exhibit assumes that trains stopping at Mukilteo Station abide by the BNSF, City of Mukilteo Quiet Zone Agreement and no horns or whistles are sounded at the stop.

3.4.2 FHWA Traffic Noise Model TNM 2.5

The FHWA TNM 2.5 impact assessment requires noise measurements validated by counted traffic during the measurement. Once the model validates to within 2 dB of the measured level, the analyst uses the model to predict existing and future 2030 peak hour traffic sound levels and to develop screening for each of the alternatives.

The TNM validation site ideally fits the requirements for a model used to determine the screening distance described in section 2. For the FHWA and combined FHWA/ FTA rubber-tired source on this project the peak hour 2030 peak traffic on SR 525 was used to calculate this screening distance.

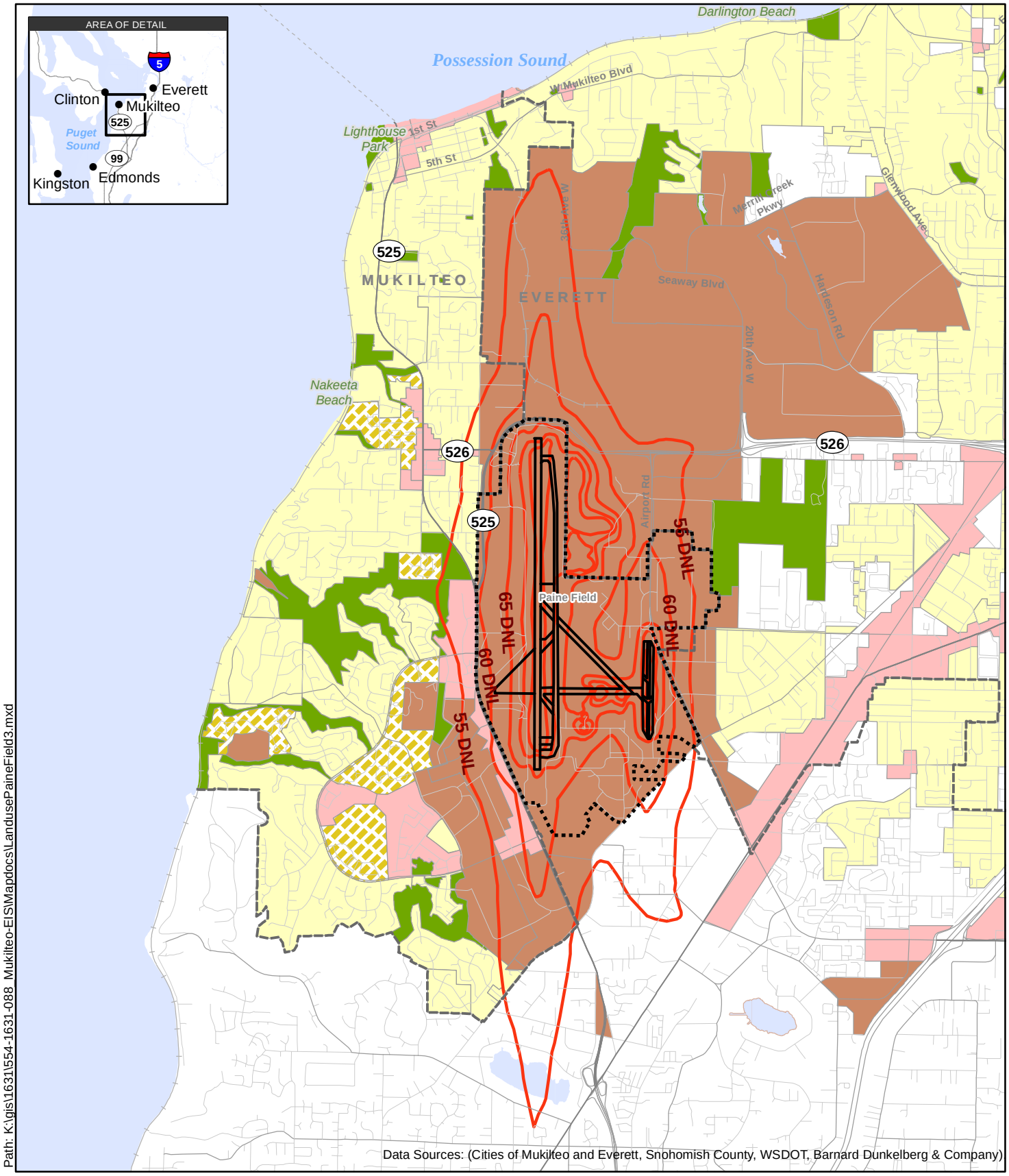
4 AFFECTED ENVIRONMENT

The discussion below looks at the local zoning and considers noise and vibration effects from existing sources before project alternatives alter the affected environment. The section employs local zoning maps, measurements at various locations, and screening maps of each of the alternatives to identify where project alternatives may cause a substantial change to the present environment.

4.1 Local Zoning

Many noise sources such as the Snohomish County Airport at Paine Field, freight and passenger trains on the BNSF railroad tracks, barge and rail traffic at the Port of Everett Mount Baker Terminal, traffic on SR 525 and local streets, and ferry vessels at the Mukilteo ferry terminal make noise an important issue to the Mukilteo residents near the waterfront. The proximity of residential uses to the 55 DNL noise contour shown in the Paine Field Noise Contours and Nearby Land Use map (Exhibit 15) indicates that many Mukilteo residents experience noise from Paine Field.

Exhibit 16 shows land uses surrounding the Mukilteo ferry terminal and the locations of the noise measurement locations listed in Exhibit 17. The project area contains noise-sensitive land uses in the residential areas north and south of the railroad tracks. The railroad dominates noise levels in the residential area south of the track where residents experience comparatively minor amounts of noise from the existing ferry terminal, airport, transfer facility, or roadway traffic. North of the railroad tracks, rail vehicles and ferry traffic along SR 525 also play a substantial part in establishing the ambient sound level for residential land use nearest the waterfront.



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- Noise Exposure Contours (2008)
- Paine Field
- Single-family Residential
- Multi-family Residential
- Parks/Public Open Space
- Commercial
- Industrial
- Aquatic

N

0 4,000

Feet

Exhibit 15. **Paine Field Noise Contours and Nearby Land Use**

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N

0 450

Feet

Legend

Description	Residential/ Recreational	Commercial	Undeveloped
EDNA	A	B	N/A
FTA Cat	2/3	N/A	N/A
FHWA Cat	B	C	D

● Sound Measurement Location

Exhibit 16. **Land Use and Sound Measurement Locations**

Mukilteo Multimodal Project

4.2 Measurements

As discussed in Chapter 3, this analysis considered noise studies made over the last 7 years and selected sensitive receivers that would best represent the existing ambient sound levels in the waterfront area of the city of Mukilteo. These measurements are used to both support validation of the FHWA TNM 2.5, and establish an existing sound level for determining effects in the FTA Transit Noise Model. Exhibit 17 shows all sound level measurement locations use to achieve these purposes. Both a L_{eq} and L_{dn} are reported for the measured sound level are shown in Exhibit 17. The sections that follow give a brief description of the measurement site and the purpose for which it was selected.

Exhibit 17. Sound Level Measurements

Original Site #	Project Site #	Day / Night Measurement Range	Time Period	15-30 min. L_{eq}	Calculated L_{dn}	Address
Port of Everett Satellite Rail/Barge Transfer Facility Noise Analysis (RBTF), May 2004						
SLM-1	RBTF-1	39.5 to 76	68 hrs	-	76.7	1146 Second Street
SLM-2	RBTF-2	38.1 to 58.7	68 hrs	-	57.7	1513 Mukilteo Lane
Noise Monitoring Tech Memo (TM), October 2004						
Site 1	TM-1	49.7 to 64	24 hrs	-	66.2	615 Third Street
Site 2	TM-2	42.4 to 71.9	24 hrs	-	70.4	822 Second Street
Adolfson Associates (AA), March 2005						
M-3	AA-1		30 min	71.6	69.6	103 Cornelia Avenue
Mukilteo Multimodal Measurements (MMM), March 2011						
-	MMM-1		15 min	70.4	68.4	612 Third Street
-	MMM-2	41 to 55.3	13 hrs	-	52.1	NOAA Research Facility

4.2.1 FHWA Traffic Sound Level Measurements

Measurement MMM-1 represents the only Mukilteo Multimodal Project measurement site necessary for the FHWA TNM 2.5 noise model validation. This site is within 10 feet of the SR 525 shoulder. A steep drop, which partially shields the home from traffic noise, prevents moving the meter farther away from the active traffic lanes, This site matches closely to Site TM-2, further supporting the assumption that measurements for the 7-year period have changed little over the time period these reports analyzed the noise environment. Traffic for this measurement was noted to be moving slightly faster than the 25 miles per hour (MPH) posted speed limit for this area. The analyst counted 452 autos, 8 medium trucks (MTs) and 4 heavy trucks (HTs) per hour for southbound SR 525. Northbound SR 525 had 340 autos, 12 MTs and 4 HTs per hour.

4.2.2 FTA Existing Environmental Sound Level Measurements

All the measurements including MMM-1 have calculated Ldn sound levels used to establish an existing sound level for the waterfront area for calculating noise sensitive land uses in the FTA modeling and analysis process. A description of each of the measured sites follows:

Measurement RBTF-1, taken at 1146 Second Street, for the Port of Everett Mount Baker Terminal, in the backyard, approximately 26 feet north of the house adjacent at the chain-linked fence near the northwest property line, overlooks the Mukilteo Tank Farm. This measurement represents residential sound levels south of the ferry terminal and railroad tracks. The residents here have clear line of sight and exposure to the BNSF rail line, about 60 feet below the grade of this backyard. The Paine Field Spur is not visible from this location, but is about 60 feet below grade and south of the BNSF main line. The meter was set up on Thursday, February 10, 2004 at 3:30 PM and ran until 3 PM Friday, February13, 2004. During set and retrieval of the meter, minor sources of noise were noted, including cars on First Street, crows, distant ferry noise, and airplanes. The only major source of noise was during the pass-by event of trains along the BNSF rail line, which included locomotive, railcar, and horn blasts. The recent Quiet Zone agreement would reduce the residential horn noise exposure at this location.

Measurement RBTF-2 also taken for the Port of Everett Mount Baker Terminal project, is in the front yard of 1513 Mukilteo Lane, just south of the lane, overlooking the Port of Everett property to the west. The meter was placed approximately 50 feet north of the house on Tuesday, February 10, 2004 at 4 PM, and retrieved at 2:45 PM on Friday, February 13, 2004. This measurement represents most western Mukilteo Multimodal Project limit residents. Traffic along Mukilteo Lane provided the major sources of noise noted during the meter set and retrieval. Trains were audible, but not considered a major source of noise at this location. Minor sources of noise included traffic on Fifth Street (south of this residence), nearby chain saw noise, planes, boats, and nearby voices.

Site TM-1, measured by WSDOT noise staff for the city of Mukilteo's Quiet Zone application, provides a representative residential site near SR 525 overlooking the current ferry terminal location. This site on the corner of Third Street and the Mukilteo Speedway, at 615 Third Street, provides an example of ferry traffic on the highway and a representative link to the MMM-1 in the previous section. The measurement taken approximately 55 feet from the edge of roadway and at-grade with the roadway ran for 24 hours in 2004 to determine the day/night sound level Ldn for this area.

TM-2, another late-2004, 24-hour measurement, at 822 Second Street was selected as a representative of houses adjacent to the BNSF railroad tracks that pass through Mukilteo and the project area. This site also helped provide the Ldn sound level data

needed by the city of Mukilteo in the Tech Memo written for the Mukilteo Quiet Zone application. Residents at and near TM-2 have a clear line of site to the train tracks 130 feet to the north; the train tracks are approximately 30 feet below the grade of the measurement location.

AA-1, another measurement with train traffic as the dominant noise source came from a WSF consultant, Adolfson Associates. Located near 103 Cornelia Avenue, the residence closest to the proposed ferry terminal, site AA, was measured at 9:40 AM and provides a 30-minute short-term measurement. Exhibit 17 approximates the L_{dn} shown based on the time of day and equations in the FTA Noise and Vibration Assessment Manual.

Site MMM-2 was selected to represent typical sound levels near the ferry terminal. This recent measurement provides representation for the Losvar Condominiums and Silver Cloud Hotel residential land use near the beach and ferry terminal. The dominant sound levels observed when setting and retrieving the meter, came from the docking ferry and people on the beach. The Silver Cloud Hotel and the National Oceanic and Atmospheric Administration (NOAA) Fisheries Service Mukilteo Research Station (NOAA facility) shielded the meter from most train and auto traffic noise, so that most of the noise measured came from these two beach sources in this location.

4.3 Inventory of Noise and Vibration Sensitive Locations

The four exhibits that follow show each of the alternatives considered in this noise and vibrations analysis after applying the screening distances described in Exhibit 14 on page 3-6. In accordance with the three-step process described in FTA's Transit Noise and Vibration Impact Assessment guidance manual, Exhibit 18 provides an inventory of the affected properties identified in this screening process. Only sites identified in this inventory require additional assessment of noise or vibration effects. This report make a general assessment of the noise-sensitive location listed in this inventory and discusses the results in the Environmental Effects and Abatement section that follows.

Vehicles such as trucks, buses, and automobiles, intended to use the facilities designed by this project, have rubber tires and suspension systems that provide vibration isolation. For this reason, these types of vehicles rarely cause ground-borne noise or vibration. When these types of vehicles cause windows to rattle, the source is almost always attributable to low-frequency airborne noise. None of the project elements are anticipated to cause vibration concerns.

Exhibit 18. Noise and Vibration Sensitive Locations Inventory

Noise & Vibration Sensitive Locations	Project Elements			
	Ferry Vessel Terminal Dock	**Parking Facility**	**SR 525 and Access Roads**	**Transit Center / Mukilteo Station**
No-Build Alternative				
N / A	No Noise or Vibration Sensitive Locations Identified			
Preferred Alternative				
None*	No Noise or Vibration Sensitive Locations Identified			
Existing Site Improvements				
Losvar Condominiums	Noise	Noise	--	--
Silver Cloud Hotel	Noise	Noise	Noise	Noise
111 Park Avenue	--	--	--	Noise
724 Second Street	--	--	--	Noise
726 Second Street	--	--	--	Noise
728 Second Street	--	--	--	Noise
Elliot Point 1				
None	No Noise or Vibration Sensitive Locations Identified			

* The Preferred Alternative is a refinement of Elliot Point 2, which in the Draft EIS included a parking area near the Losvar Condominiums and the Silver Cloud Hotel. The Preferred Alternative relocated the parking area to the Mukilteo Tank Farm, which has no nearby noise and vibration sensitive properties.

5 ENVIRONMENTAL EFFECTS AND ABATEMENT

This chapter describes the transit and highway traffic noise and vibration effects based on criteria presented in Chapter 2. This section considers the environmental noise and vibration effects of both the operation and construction phases of each proposed alternative. For the impacts identified, if any, a subsection discusses abatement of the impacts described, as well as indirect, secondary and cumulative effects of each of the alternatives.

5.1 Operation Environmental Impacts

Only FHWA's highway traffic methodology considers operational increases of source component out to a future design year to identify impacts. FTA guidance only compares existing effects and compares all build alternatives, including the decision not to build with the existing condition to identify the effects. For this project the analyst compares 2010 SR 525 traffic provided in the Transportation study with projected 2040 traffic volumes and speeds using FHWA's traffic noise model TNM 2.5. Even with the projected over 25 percent increase in traffic on SR 525 over that 20-year period, it will only cause a 1 dBA increase in sound level to a receiver on the shoulder of SR 525 and will move the 65 dBA impacts threshold contour out only 10 feet, or from 25 feet from the lane of traffic to 35 feet out. This 35-foot distance is used with the other screening distances in FTA guidance to identify the noise-sensitive land use for the project.

5.1.1 No-Build Alternative

In an FTA Noise Assessment process the No-Build is the basis upon which project changes are compared. Sound levels from the existing No-Build Alternative provide the base axis on the bottom of the FTA noise criteria shown in Exhibit 9 on page 2-3 of this report. As can be seen by this exhibit no impact could be associated to sound levels on this base line. This process assumes the alternative would change none of the noise generating activities and therefore would not have impacts associated with it.

For the FHWA process, noise abatement criteria cannot be approached or exceeded as long as the project has some type 1 (new highway expansion) improvement. There are no type 1 improvements associated with the No-Build Alternative. Though the new marine terminal facilities would move the 65 dBA highway traffic noise contour 10 feet closer to noise sensitive land uses in 2030, this would not be close enough to identify FHWA impacts using the 66 dBA L_{eq} FHWA NAC and there are no type 1 activities associated with it. There are no impacts in the No-Build Alternative.

5.1.2 Preferred Alternative

Noise Impacts

The impact assessment process for the Elliot Point 2 Alternative in the Draft EIS identified a ferry employee parking facility as the only project element of this alternative with the potential to increase noise levels at the Silver Cloud Hotel and Losvar Condominiums, but no impacts were identified. The design refinements to Elliot Point 2 as the Preferred Alternative moved the employee parking onto the Mukilteo Tank Farm site, and provided additional public parking spaces to the east of the First Street extension. It also modified the configuration of the transit center. The alternative also includes a connection to the Mt. Baker Terminal crossing with minor intersection revisions. This area was also included in the updated noise and vibration impact screening assessment. The Preferred Alternative's design places all potential sources of transit or traffic noise increase beyond the FTA and FHWA screening distances for noise- and vibration-sensitive receivers (Exhibit 19). No operational impacts are anticipated with this alternative, and no mitigation is required.

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FHWA Screening Distance

FTA Screening Distance

N

0 300

Feet

Exhibit 19. **Preferred Alternative Possible FTA and FHWA Noise Effects**

Mukilteo Multimodal Project

5.1.3 Existing Site Improvements Alternative

This alternative has the greatest number of noise-sensitive receivers (Exhibits 18 and 20). A general assessment of these locations are discussed in the sections that follow.

Noise Impacts

Silver Cloud Hotel

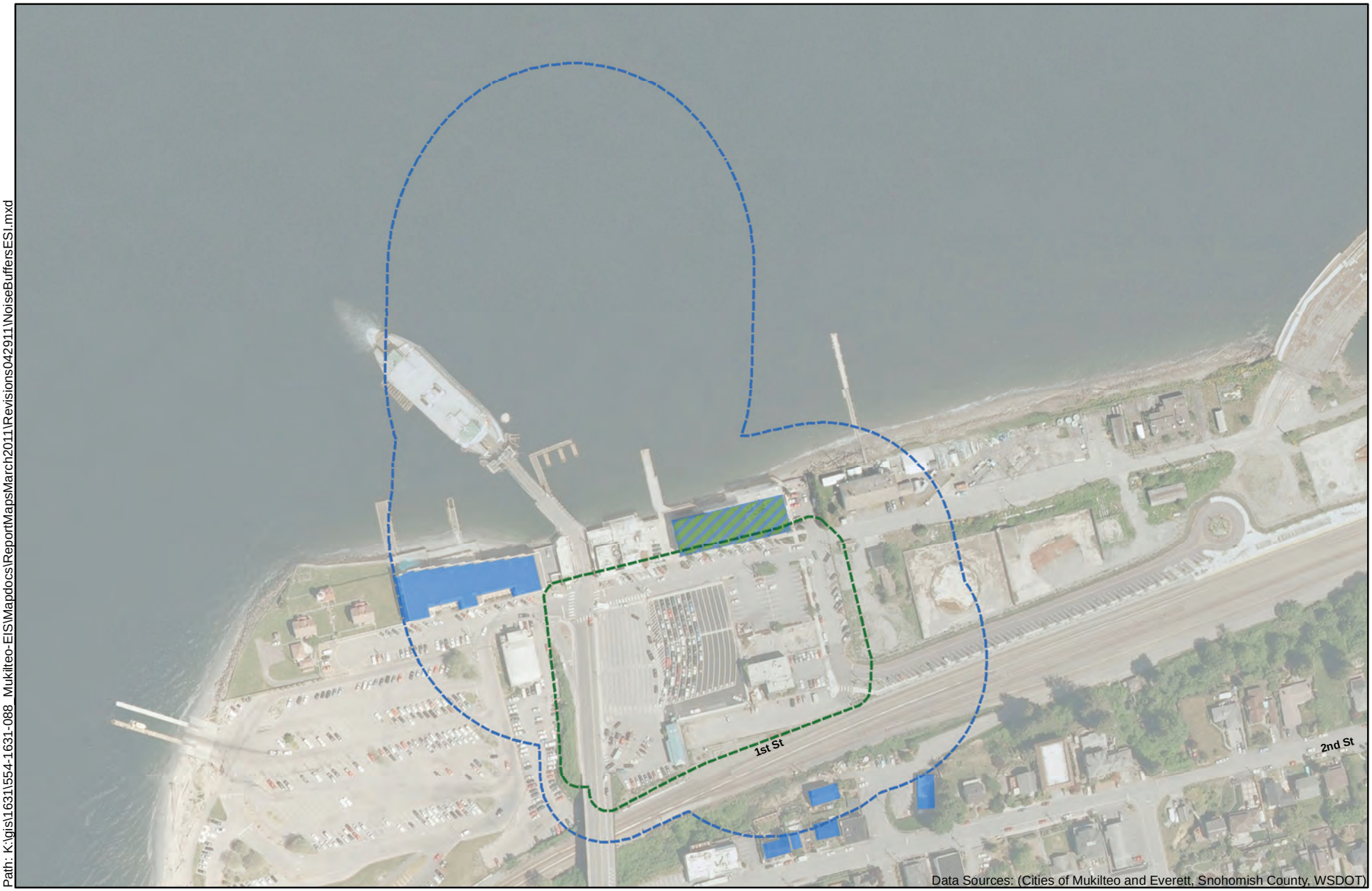
The Silver Cloud Hotel is the only receiver that falls within the FHWA screening distance. All four elements of this project alternative have some part of the hotel within its respective screening distance (see Exhibits 18 and 20).

Because the hotel falls within the 65 dBA Leq screening distance, a TNM model was created to determine noise effects from the FHWA line sources. The results indicate that the hotel sound level from these sources during peak traffic volumes at speed limit speed are, at most, expected only reach 56 dBA Leq, well below the 66 dBA NAC contours that would require analysis of this source using FHWA methods and criteria.

A general assessment of the other three FTA noise resources, the ferry, the parking, and the transit center, and even adding the traffic numbers used in the FHWA TNM 2.5 model to an FTA model, indicates that there is no impact at the hotel. The sound level at the hotel using this model was anticipated to reach 55 dBA. This would only be a moderate impact for existing sound levels in the low 50s. It would not be an impact at this location.

Losvar Condominiums

The Losvar Condominium falls well within the noise screening distance for the ferry terminal. The parking screening distance just touches the east end of these condos (see Exhibits 18 and 20). The project proposes to move the ferry dock a little over 60 feet away from the current location. An FTA general assessment model produced to determine effects from these two transit sources indicates residents can anticipate a sound level contribution of 52 dBA Ldn. The FTA model does not indicate this sound level is an impact for these sources.



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Feet

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FTA Screening Distance

FHWA Screening Distance

Noise Receptors

Subject to FTA Screening Criteria

Subject to FTA and FHWA Screening Criteria

Exhibit 20. **Existing Site Improvements Alternative Possible FTA and FHWA Noise Effects**

Mukilteo Multimodal Project

Mukilteo Second and Park Residents

Four residential receivers on the hill overlooking the Existing Site Improvements Alternative are also within the screening distance for the transit center. The model, which considers the closest of these residents for determining noise effects for this group of residents, indicates this FTA resource should contribute only 51 dBA L_{dn} to this already noisy environment. The model does not predict an impact for this location.

Vibration Impacts

All project noise- and vibration-sensitive receivers are outside FTA and FHWA screening distances. No operational impacts are identified with this alternative, so no further noise or vibration analysis is required.

5.1.4 Elliot Point 1 Alternative

All project noise- and vibration-sensitive receivers are outside FTA and FHWA screening distances (Exhibit 21). No operational impacts are identified with this alternative, so no further noise or vibration analysis is required.

Vibration Impacts

No vibration sensitive receivers are within the screening distance necessary to consider operational vibration effects from this alternative.

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Legend

FTA Screening Distance

FHWA Screening Distance

N

0 400

Feet

Exhibit 21. **Elliot Point 1 Alternative Possible FTA and FHWA Noise Effects**

Mukilteo Multimodal Project

5.2 Construction Impacts

Impacts due to construction noise depend on the length of the construction activity, the type of equipment used, and the frequency of repetitive activities. Exhibit 22 lists typical peak operating noise level of various construction equipment at a distance of 50 feet. Noise levels decline over distance at a rate of 6 dBA per doubling of distance from the source.

Exhibit 22. Construction Equipment Sound Levels

Equipment	(Typical Noise Level (dBA) 50 feet from Source
Air Compressor	81
Backhoe	80
Concrete Pump	85
Concrete Mixer	82
Concrete Vibrator	76
Crane Derrick	88
Crane Mobile	83
Dozer	85
Generator	81
Grader	85
Jackhammer	88
Loader	85
Paver	89
Pile Driver	101
Pneumatic Tool	85
Pump	76
Rock Drill	98
Roller	74
Saw	76
Scraper	89
Shovel	82
Truck	88

Sources: FTA 2006; U.S. Environmental Protection Agency (EPA) 1971

As discussed previously in the local regulations section, the WAC and the MMC noise control ordinance exempt daytime construction noise from the general noise requirements. However, in spite of this exemption, construction noise could still affect nearby residences.

Activities that have the potential to produce a high level of vibration at surrounding properties include pile driving, jack hammering, and use of heavy earth-moving equipment. The effects of ground-borne vibration can include shaking of building

floors, rattling of windows, rumbling sounds, and in extreme cases, damage to buildings.

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods employed. Vibrations caused by construction equipment travel through the ground and attenuate over distance. Buildings near the construction respond to the vibrations, with results ranging from no perceptible effect at the lowest levels, to low rumbling sounds and perceptible vibrations at moderate levels, and to slight damage to buildings at the highest levels. Old, fragile buildings have a lower tolerance for vibration.

Exhibit 23 shows average vibration levels for various types of construction equipment in units of Peak Particle Velocity (PPV). Although the table gives one level for each piece of equipment, there is a considerable variation in reported ground vibration levels from construction activities. The data provide a reasonable estimate for a wide range of soil conditions.

Exhibit 23. Construction Equipment Vibration Source Levels

Equipment	PPV at 25 feet (IN/SEC)
Pile Driver (impact)– upper range	1.518
Pile Driver (impact)–typical	0.644
Pile Driver (sonic)– upper range	0.734
Pile Driver (sonic)–typical	0.17
Clam shovel drop (slurry wall)	0.202
Hydromill (slurry wall)–in soil wall)–in soil	0.008
Hydromill (slurry wall)– in rock	0.017
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Transit Noise and Vibration Impact Assessment (FTA 2006).
in/sec inches per second

5.2.1 No-Build Alternative

Even under the No-Build Alternative, activities would include construction of a replacement slip and terminal buildings, and ongoing maintenance activities for the existing ferry terminal. The discussion below describes the noise and vibration impacts anticipated from these activities.

Noise Impacts

Temporary, short-term noise effects from construction noise could occur during these activities, but would be most pronounced during pile driving and demolition. Noise effects to be expected include temporary speech interference for passersby and individuals working near the construction activity.

Vibration Impacts

While construction vibration may be perceptible at nearby properties, construction activities are less likely to affect them under the No-Build Alternative at the Mukilteo Multimodal Ferry Terminal Project site than under any other alternative. No existing nearby structures will be damaged nor federal annoyance criteria established by the U.S. Department of Transportation (USDOT) exceeded. There is a potential for construction vibration to affect laboratory experiments conducted at the nearby NOAA facility.

5.2.2 Preferred Alternative

Construction of the Preferred Alternative is anticipated take approximately 2 years. Major construction elements include demolition, earth moving, hauling, grading, paving, pile driving, pier construction, building construction, and road construction. General construction noise and vibration effects would be expected during all of these construction elements, but would be most noticeable during demolition, pile driving, and road construction.

Noise Impacts

Temporary effects from construction noise would be most pronounced during pile driving and demolition. Construction noise could be annoying for passersby and individuals working near the construction activity and temporarily disrupt the ability to hold a conversation.

Vibration Impacts

There are no local, state, or federal regulations that define thresholds of acceptable construction vibration levels. However, FTA policy recommends construction vibration should be assessed in cases where there is a significant potential for effects from construction activities, such as blasting, pile driving, and demolition in close proximity to sensitive structures. Recommended threshold criteria of maximum allowable vibration levels are 0.20 in/sec (PPV) for fragile buildings, and 0.12 in/sec for extremely fragile historic buildings. Vibration levels above 0.64 in/sec can be annoying to people and disrupt normal working or living environments (USDOT 1995).

The construction activity that would result in the highest levels of ground vibration under any of the alternatives is impact pile driving. The highest anticipated vibration source level would result from pile driving with a PPV at 25 feet of 1.518 in/sec, as

shown in Exhibit 23. The nearest building to the expected pile driving locations is approximately 300 feet away. Adjusting for distance attenuation produces a PPV at the building of 0.036 in/sec. This level is below the criteria for fragile buildings and the criteria for annoyance.

Existing nearby structures are not expected to be damaged or exceed federal annoyance criteria. Vibration during construction of the Preferred Alternative would be related to the one to two months needed for pile or shaft installation at the terminal, and is not anticipated to affect laboratory experiments conducted at the nearby NOAA Mukilteo Research Station.

The Preferred Alternative is further removed from noise-and vibration-sensitive residents and favored outdoor recreational and commercial sites compared to the Existing Site Improvements.

5.2.3 Existing Site Improvements Alternative

The Existing Site Improvement Alternative is closer to noise-and vibration-sensitive residents and the central waterfront outdoor recreational and commercial sites compared to the Preferred Alternative. Under the Existing Site Improvement Alternative, the Losvar Condominiums and the Silver Cloud Hotel inhabitants would likely experience greater noise and vibration annoyance than other area inhabitants due to their proximity to the project improvement.

Noise Impacts

Construction noise impacts are similar to those listed under the Preferred Alternative above.

Vibration Impacts

Existing nearby structures would not be damaged or exceed federal annoyance criteria. There is a potential for construction vibration to affect laboratory experiments conducted at the nearby NOAA facility due to this alternative's proximity to the laboratory. Other construction noise impacts are similar to those listed under the Preferred Alternative above.

5.2.4 Elliot Point 1 Alternative

Noise and vibration effects related to construction of the Elliot Point 1 Alternative would be similar to those described for construction of the Preferred Alternative, although noise levels may differ due to the different locations of the terminal, parking, roadway, and transit facility components. Similar to the Preferred Alternative, the Elliot Point 1 Alternative is further removed from noise-and vibration-sensitive residents and favored outdoor recreational and commercial sites compared to the Existing Site Improvements Alternative.

Noise Impacts

Construction noise impacts are similar to those listed under the Preferred Alternative above.

Vibration Impacts

Construction vibration impacts are similar to those listed under the Preferred Alternative above.

5.3 Indirect and Secondary Effects

Indirect effects are caused by actions that are later in time or further removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate. Because this project does not substantially increase capacity to any of the current facilities, no indirect effects are reasonably foreseeable for any of the current alternatives proposed.

5.4 Cumulative Effects

The noise modeling and analysis presented earlier considers the long-term cumulative effects of noise from existing noise sources, including the freight and passenger rail, and all traffic forecast to operate within the study area. This includes traffic from future development proposals such as Mukilteo Station, the Port of Everett Mount Baker Terminal, and both residential and commercial development on remaining portions of the Mukilteo Tank Farm and in the downtown core. By including these projects in the baseline conditions, possible cumulative effects associated with the project have been considered.

5.5 Abatement Measures

5.5.1 Abatement for Long-Term Impacts

Noise and vibration effects of the four alternatives were analyzed, as discussed in 5.1. None of the project alternatives anticipate noise or vibration effects that would cause impacts that require abatement. No further analysis is necessary.

5.5.2 Abatement for Construction Impacts

High noise activities, such as demolition activities and pile driving, would follow a pre-approved schedule to limit the noise effects of the construction activity on the nearby residential community on the bluff to the south of the project site. Construction traffic would primarily occur during normal business hours; however, construction during evening and/or weekends may occur on occasion.

Construction Noise Abatement

To minimize the duration of high noise levels, construction activities should be staged to occur simultaneously, if possible. The total noise level of the activities together would not be substantially greater, or more noticeable, than the largest of the noise levels generated by each of the single noise events.

Construction noise can be minimized by several means, including the use of effective vehicle mufflers, engine intake silencers, engine enclosures, shutting off equipment when not in use, and locating activities away from noise-sensitive lands when possible. Portable noise barriers can be placed around stationary equipment, such as a concrete crushing plant. Equipment drivers should be encouraged to avoid backing up as much as possible to reduce the use of back-up alarms.

The contractor would be encouraged to adhere to WAC and MMC requirements to restrict noise-generating construction activities to daylight hours or obtain a variance from the City of Mukilteo.

Construction Vibration Abatement

The effects of construction vibration on experiments conducted during the construction timeframe at the NMFS facility would be minimized through pre-construction coordination and notification. It is anticipated that WSDOT would coordinate with the NOAA facility to minimize the effects of construction vibration on any experiments.

5.5.3 Abatement for Indirect and Secondary Effects

Because no indirect or secondary noise or vibration effects are reasonably foreseeable, no abatement of indirect or secondary noise and vibration effects is necessary.

5.5.4 Abatement for Cumulative Effects

If other construction projects occur concurrently with construction for the Mukilteo Multimodal Project, and if construction activities are not well coordinated, construction activities could have an adverse cumulative effect on local noise levels. Coordination of construction activities would be paramount to reducing this construction cumulative effect.

6 REFERENCES

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7 CONTRIBUTORS

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Jim Laughlin; Air, Noise, Energy Technical Manager; Reviewer; BS Marine Biology, California State University, Long Beach; 9 years of experience

ATTACHMENT A

City of Mukilteo Quiet Zone Documentation

CITY OF MUKILTEO

11930 CYRUS WAY • MUKILTEO, WASHINGTON 98275

March 3, 2010

Jo Strang, Associate Administrator for Railroad Safety
Federal Railroad Administration
Office of Railroad Safety
1200 New Jersey Avenue SE
MS 25
Washington, DC 20590

RE: Notice of Quiet Zone Establishment, DOT Crossing #085452V

Dear Ms. Strang:

Pursuant to the Final Rule, 49 CFR Parts 222 and 229, covering the "Use of Locomotive Horns at Highway-Rail Grade Crossings" and specifically as it pertains to the creation and establishment of whistle-ban (i.e., "Quiet Zone") railroad grade crossing, the City of Mukilteo, Washington intends to establish a 24-hour, all-days, New Quiet Zone for a segment around the Mt. Baker Avenue crossing, BNSF Railroad, from MP 28.63 through MP 29.13 inclusive of one public grade crossing. This crossing is formally identified by its unique U.S. DOT identification number, 085452V. The particulars as required by the Final Rule are contained in the attached material. A formal Notice of Intent was mailed May 31, 2007 to officials at the WUTC, WSDOT, BNSF and Amtrak. The Supplemental Safety Measure (SSM) was activated and tested by BNSF on February 18, 2010 and found to be functional. Therefore, the requested effective date for the QZ to go into effect is March 26, 2010.

Whereas the "Notice of Quiet Zone Establishment" pertains to a New Quiet Zone with a SSM implemented, the basis for establishing this Quiet Zone shall be Section 222.39(a)(1) of the "Final Rule" as published in the Federal Register, Vol. 71, No. 159, August 17, 2006.

Under the laws of the State of Washington, as Chief Executive Officer of the City of Mukilteo, Washington, I attest and certify that responsible officials of this City, including Police Chief Mike Murphy, have reviewed the relevant documentation and have examined and witnessed the improvements described by this documentation and do concur that this New Quiet Zone can and should be established with the full support of the City of Mukilteo. The City of Mukilteo is the responsible highway/street/road traffic

law enforcement entity for this railroad crossing. Responsibility for monitoring compliance with the train horn rule rests with the City Public Works Director: Larry Waters, who can be reached at 425-263-8080 or lwaters@ci.mukilteo.wa.us or the same address above.

Thank you for your assistance and cooperation in this matter.

Sincerely,

Joe Marine

Joe Marine
Mayor
City of Mukilteo
425-263-8017
jmarine@ci.mukilteo.wa.us

Attachments:
Current and Marked up Crossing Inventory Forms

Pc: Mike Murphy, Mukilteo Police Chief

Certified, Return Receipt Requested:

Vicki Elliott
Rail Section Manager
WUTC
1300 Evergreen Park Drive S
Olympia, WA 98504

Carolyn Simmonds
WSDOT – Rail Division
WSDOT
P.O. Box 47387
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Todd M. Kuhn, PE
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Manager Public Projects
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Seattle, WA 98134

Kurt Laird
Amtrak
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Seattle, WA 98104

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 1/19/2010

Crossing No.: *085452V* Update Reason: *Changed Crossing* Effective Begin-Date of Record: *08/17/06*

Railroad: *BNSF BNSF Rwy Co. [BNSF]* End-Date of Record:

Initiating Agency *Railroad* Type and Positilon: *Public At Grade*

Part I Location and Classification of Crossing

Division:	*NORTHWEST*	State:	*WA*
Subdivision:	*SCENIC*	County:	*SNOHOMISH*
Branch or Line Name:	*WENACHE-SEATTLE*	City:	*In MUKILTEO*
Railroad Milepost:	*0028.88*	Street or Road Name:	*MT BAKER AVE*
RailRoad I.D. No.:	*0050*	Highway Type & No.:	*CITY ST*
Nearest RR Timetable Stn:	*MUKILTEO*	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	*31-3D*
Crossing Owner:		Latitude:	*47.9503442*
ENS Sign Installed:		Longitude:	*-122.2938521*
Passenger Service:	*AMTRAK*	Lat/Long Source:	*Actual*
Avg Passenger Train Count:	*8*	Quiet Zone:	*-No- YES*
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

ST/RR A ST/RR B ST/RR C ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: *(800)832-5452* Railroad Contact: *(913)551-4540* State Contact:

Part II Railroad Information

Number of Daily Train Movements:

Total Trains: *43* Total Switching: *0* Less Than One Movement Per Day: *No*

Day Thru: *22*

Typical Speed Range Over Crossing: From *1* to *55* mph Maximum Time Table Speed: *55*

Type and Number of Tracks: Main: *2* Other *1* Specify: *X-OVER*

Does Another RR Operate a Separate Track at Crossing? *No*

Does Another RR Operate Over Your Track at Crossing? *Yes: ATK*

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing *085452V*

Effective Begin-Date of Record: *08/17/06*
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	~~3~~ 4	Highway Stop Signs:	*0*
Advanced Warning:	~~NO~~ YES	Hump Crossing Sign:	
Pavement Markings:	*No Markings*	Other Signs: *0*	Specify:
		0	

Train Activated Devices:

Gates:	~~2~~ 4	4 Quad or Full Barrier:	YES
Mast Mounted FL:	~~2~~ 4	Total Number FL Pairs:	~~4~~ 8
Cantilevered FL (Over):	~~2~~ Ø	Cantilevered FL (Not over):	*0*
Other Flashing Lights:	*0*	Specify Other Flashing Lights:	
Highway Traffic Signals:	*0*	Wigwags: *0*	Bells: ~~2~~ 2
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:	NO	Type of Train Detection:	~~DC/AFO~~ CONSTANT WARNING
Track Equipped with Train Signals?	*Yes*	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	*Open Space*	Smallest Crossing Angle:	*60 to 90 Degrees*
Number of Traffic Lanes Crossing Railroad:	*2*	Are Truck Pullout Lanes Present?	*No*
Is Highway Paved?	*Yes*		
Crossing Surface:	~~Rubber~~ CONCRETE	If Other:	
Nearby Intersecting Highway?	*Less than 75 feet*	Is it Signalized?	NO
Does Track Run Down a Street?	*No*	Is Crossing Illuminated?	NO
Is Commercial Power	*Yes*		

Part V: Highway Information

Highway System:	*Non-Federal-aid*	Functional Classification of Road at Crossing:	*Urban Local*
Is Crossing on State Highway System:	*No*		
Annual Average Daily Traffic (AADT):	*000322*	AADT Year:	*1993*
Estimated Percent Trucks:	*02*	Avg. No of School Buses per Day:	*0*
Posted Highway Speed:	*0*		

U.S. DOT - CROSSING INVENTORY INFORMATION
AS OF 12/16/2009

Crossing No.: *085452V* Update Reason: *Changed Crossing* Effective Begin-Date of Record: *08/17/06*

Railroad: *BNSF BNSF Rwy Co. [BNSF]* End-Date of Record:

Initiating Agency *Railroad* Type and Positiion: *Public At Grade*

Part I Location and Classification of Crossing

Division:	*NORTHWEST*	State:	*WA*
Subdivision:	*SCENIC*	County:	*SNOHOMISH*
Branch or Line Name:	*WENACHE-SEATTLE*	City:	*In MUKILTEO*
Railroad Milepost:	*0028.88*	Street or Road Name:	*MT BAKER AVE*
RailRoad I.D. No.:	*0050*	Highway Type & No.:	*CITY ST*
Nearest RR Timetable Stn:	*MUKILTEO*	HSR Corridor ID:	
Parent Railroad:		County Map Ref. No.:	*31-3D*
Crossing Owner:		Latitude:	*47.9503442*
ENS Sign Installed:		Longitude:	*-122.2938521*
Passenger Service:	*AMTRAK*	Lat/Long Source:	*Actual*
Avg Passenger Train Count:	*8*	Quiet Zone:	*No*
Adjacent Crossing with Separate Number:			

Private Crossing Information:

Category: Public Access:

Specify Signs: Specify Signals:

ST/RR A	ST/RR B	ST/RR C	ST/RR D

Railroad Use:

State Use:

Narrative:

Emergency Contact: *(800)832-5452* Railroad Contact: *(913)551-4540* State Contact:

Part II Railroad Information

Number of Daily Train Movements:

Total Trains: *43* Total Switching: *0*

Typical Speed Range Over Crossing: From *1* to *55* mph

Type and Number of Tracks: Main: *2* Other *1*

Less Than One Movement Per Day: *No*

Day Thru: *22*

Maximum Time Table Speed: *55*

Specify: *X-OVER*

Does Another RR Operate a Separate Track at Crossing? *No*

Does Another RR Operate Over Your Track at Crossing? *Yes: ATK*

U.S. DOT - CROSSING INVENTORY INFORMATION
Continued

Crossing *085452V*

Effective Begin-Date of Record: *08/17/06*
End-Date of Record:

Part III: Traffic Control Device Information

Signs:

Crossbucks:	*3*	Highway Stop Signs:	*0*
Advanced Warning:	*No*	Hump Crossing Sign:	
Pavement Markings:	*No Markings*	Other Signs: *0*	Specify:
		0	

Train Activated Devices:

Gates:	*2*	4 Quad or Full Barrier:	
Mast Mounted FL:	*3*	Total Number FL Pairs:	*0*
Cantilevered FL (Over):	*1*	Cantilevered FL (Not over):	*0*
Other Flashing Lights:	*0*	Specify Other Flashing Lights:	
Highway Traffic Signals:	*0*	Wigwags: *0*	Bells: *1*
Other Train Activated Warning Devices:		Special Warning Devices Not Train Activated:	
Channelization:		Type of Train Detection:	*DC/AFO*
Track Equipped with Train Signals?	*Yes*	Traffic Light Interconnection/Preemption:	

Part IV: Physical Characteristics

Type of Development:	*Open Space*	Smallest Crossing Angle:	*60 to 90 Degrees*
Number of Traffic Lanes Crossing Railroad:	*2*	Are Truck Pullout Lanes Present?	*No*
Is Highway Paved?	*Yes*		
Crossing Surface:	*Rubber*	If Other:	
Nearby Intersecting Highway?	*Less than 75 feet*	Is it Signalized?	
Does Track Run Down a Street?	*No*	Is Crossing Illuminated?	
Is Commercial Power	*Yes*		

Part V: Highway Information

Highway System:	*Non-Federal-aid*	Functional Classification of Road at Crossing:	*Urban Local*
Is Crossing on State Highway System:	*No*		
Annual Average Daily Traffic (AADT):	*000322*	AADT Year:	*1993*
Estimated Percent Trucks:	*02*	Avg. No of School Buses per Day:	*0*
Posted Highway Speed:	*0*		

SERVICE DATE

MAR 0 3 2010

BEFORE THE WASHINGTON STATE
UTILITIES AND TRANSPORTATION COMMISSION

CITY OF MUKILTEO, Petitioner, BNSF RAILWAY CO, Respondent.	)	DOCKET TR-100221 ORDER 01 ORDER GRANTING PETITION TO MODIFY A PUBLIC HIGHWAY-RAIL GRADE CROSSING AND UPGRADE WARNING DEVICES AT MT. BAKER AVENUE USDOT: #085452V

BACKGROUND

1 On February 4, 2010, City of Mukilteo (City or Petitioner) filed with the Utilities and Transportation Commission (Commission), a petition seeking approval to modify a railroad-highway grade crossing and upgrade warning devices. The crossing is identified as USDOT #085452V and is located at the intersection of Mt. Baker Avenue and BNSF Railway's (BNSF) tracks in Snohomish County.

2 Respondent BNSF consented to entry of an Order by the Commission without further notice or hearing.

3 Current railroad warning devices at the crossing consist of cantilever mounted lights and gates.

4 Mt. Baker Avenue is classified as an urban local street with two-lane, two-way traffic and a posted vehicle speed limit of 25 miles per hour (mph). Average annual daily traffic through the crossing is estimated at 500 vehicles, including five percent commercial motor vehicles. No school buses use this crossing. Washington State Ferries has indicated that it plans to relocate the Mukilteo ferry terminal in the future. Relocation of the terminal will increase the daily vehicle usage of this crossing.

5 There are three tracks at the crossing including two mainlines and one spur. BNSF operates 24 freight trains at up to 50 miles per hour. Amtrak and Sound Transit operate 14 passenger trains a day over the crossing at up to 55 miles per hour.

6 The City plans to implement a one-half mile long quiet zone in the area of the Mt. Baker Avenue crossing. In order to qualify for a quiet zone under current federal rules, the City is upgrading the warning devices at Mt. Baker Avenue to four-quadrant gates with vehicle detection loops.

7 The City will install a new concrete panel surfaces; shoulder mounted four-quadrant gates; flashing lights with LED lenses; pedestrian bells; and vehicle detection loops. All train detection circuitry will be upgraded to constant warning time.

8 The proposed modification of this crossing is in the interest of implementing a quiet zone in the City of Mukilteo.

FINDINGS AND CONCLUSIONS

9 (1) The Washington Utilities and Transportation Commission is an agency of the State of Washington having jurisdiction over public railroad-highway grade crossings within the state of Washington. *Chapter 81.53 RCW.*

10 (2) The Mt. Baker Avenue grade crossing, identified as USDOT #085452V, is a public railroad-highway grade crossing within the state of Washington.

11 (3) RCW 81.53.261 and WAC 480-62-150 require that the Commission grant approval prior to modifying a public railroad-highway grade crossing or upgrading active crossing warning signals or devices within the state of Washington.

12 (4) Commission Staff investigated the petition and recommended that it be granted with conditions.

13 (5) After examination of the petition filed by the City of Mukilteo on February 4, 2010, and giving consideration to all relevant matters and for good cause shown, the Commission grants the petition.

ORDER

THE COMMISSION ORDERS:

14 The petition of the City of Mukilteo to modify a railroad-highway grade crossing and upgrade warning devices at the intersection of Mt. Baker Avenue and Respondent's tracks in Snohomish County is granted. Approval of the petition is subject to the following conditions:

(1) The modifications must conform to those described and attached to the petition.

(2) Traffic control devices must comply with all applicable standards specified in the U.S. Department of Transportation Manual on Uniform Traffic Control Devices.

The Commissioners, having determined that this filing complies with the requirements of WAC 480-62-150(1)(f), WAC 480-62-150(2)(b) and RCW 81.53.030, directed the Secretary to enter this Order.

DATED at Olympia, Washington, and effective March 3, 2010.

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

DAVID W. DANNER, Executive Director and Secretary

NOTICE: This is an order delegated to the Secretary for decision. In addition to serving you a copy of the decision, the Commission will post on its Internet Web site for at least fourteen (14) days a listing of all matters delegated to the Secretary for decision. You may seek Commission review of this decision. You must file a request for Commission review of this order no later than fourteen (14) days after the date the decision is posted on the Commission's Web site. The Commission will schedule your request for review for consideration at a regularly scheduled open meeting. The Commission will notify you of the time and place of the open meeting at which the Commission will review the order.

The Commission will grant a late-filed request for review only on a showing of good cause, including a satisfactory explanation of why the person did not timely file the request. A form for late-filed requests is available on the Commission's Web site.

This notice and review process is pursuant to the provisions of RCW 80.01.030 and WAC 480-07-904(2) and (3).

ATTACHMENT B

Noise Measurements

Attachment B is included on the Final EIS CD.

ATTACHMENT C

Model Inputs

Attachment C is included on the Final EIS CD.